

## Claims

What is claimed is:

1. A system for contaminant reduction of semiconductor device fabrication equipment components, comprising:

a manifold having a main passageway with first and second capped ends, said first capped end configured to accept a purge fluid, a plurality of inlets disposed in between said capped ends in fluid communication with said main passageway, and an exhaust fitting disposed downstream from said plurality of inlets and being in fluid communication with said main passageway;

a plurality of manifold valves, each manifold valve having a first end connected to one of said plurality of inlets and a second end to which a semiconductor device fabrication equipment component having a contaminated surface for contaminant reduction and at least one opening is removably connectable at said at least one opening, and each manifold valve being operable to place one of said plurality of inlets into and out of fluid communication with said surface of said removably connectable component;

a purge fluid source; and

a pump.

2. The system of claim 1 wherein said plurality of inlets are spaced apart such that two sets of components are connectable to said manifold valves, each set including at least two different types of components.

3. The system of claim 1 further comprising a plurality of caps, each of said caps removably connectable to said second end of said manifold valves and to components having two openings.

4. The system of claim 3 wherein one of said caps is connected to one end of one of said components when another end of said one of said components is connected to one of said manifold valves.

5. The system of claim 3 wherein one of said caps is connected to said second end of one of said manifold valves in the absence of one of said components connected to said one of said manifold valves.

6. The system of claim 3 wherein one of said caps forms a flange connection with one of said components when connected to said one of said components, and a flange connection with one of said manifold valves when connected to said second end of said one of said manifold valves.

7. The system of claim 3 wherein each of said plurality of caps is connected to a cap valve.

8. The system of claim 7 wherein each of said plurality of caps is connected to said cap valve via tubing.

9. The system of claim 1 wherein at least one of said inlets is a downwardly facing inlet.

10. The system of claim 1 wherein at least one of said inlet is a frontwardly facing inlet.

11. The system of claim 1 wherein one of said components is a rotation assembly.

12. The system of claim 11 wherein said rotation assembly is connected to one of said manifold valves with a ball joint.

13. The system of claim 12 wherein said ball joint includes a ball flange, a male connector, and a flange .

14. The system of claim 11 wherein said rotation assembly is connected to one of said manifold valves with a rotatable joint.

15. The system of claim 11 wherein one of said inlets is downwardly facing and said rotation assembly is connected to said downwardly facing inlet.

16. The system of claim 1 wherein said one of said components is a chamber ball valve.

17. The system of claim 16 wherein said chamber ball valve is connected to one of said manifold valves with a flange connection.

18. The system of claim 17 wherein said flange connection is a KF40 flange joint.

19. The system of claim 16 wherein one of said inlets is frontwardly facing and said ball valve is connected to said frontwardly facing inlet.

20. The system of claim 1 wherein one of said components is a pressure control valve.

21. The system of claim 20 wherein said pressure control valve is connected to one of said manifold valves with a flange connection.

22. The system of claim 21 wherein said flange connection is a KF40 flange joint.

23. The system of claim 20 wherein one of said inlets is frontwardly facing and said pressure control valve is connected to said frontwardly facing inlet.

24. The system according to claim 1 wherein said inlets include two downwardly facing inlets and four frontwardly facing inlets.

25. The system according to claim 24 wherein said components include a pair of rotation assemblies connected to a first pair of manifold valves which are connected to said two downwardly facing inlets, a pair of pressure control valves connected to a second pair of manifold valves which are connected to two of said frontwardly facing inlets, and a pair of chamber ball valves connected to a third pair of manifold valves which are connected to another two of said frontwardly facing inlets.

26. The system according to claim 1 wherein said manifold includes six inlets, at least one of which is downwardly facing and at least one of which is frontwardly facing.

27. The system according to claim 1 wherein said components include different types of components and wherein two sets of each different type of component are connected to said manifold valves.

28. The system of claim 1 wherein one of said inlets is an analyzer port.

29. The system of claim 1 further comprising a frame supporting said manifold.

30. The system of claim 29 wherein said frame includes stirrups within which said manifold is inserted.

31. The system of claim 29 wherein said frame is steel.

32. The system of claim 29 wherein said frame comprises frame elements bolted together.

33. The system of claim 29 wherein said frame includes a base.

34. The system of claim 1 further comprising a first pipe connected to said pump and to said exhaust fitting.

35. The system of claim 34 further comprising a pipe valve disposed on said pipe.

36. The system of claim 34 further comprising an oven and a second pipe, said second pipe connected to said first pipe and to said oven.

37. The system of claim 1 wherein said fluid source is a nitrogen source.

38. The system of claim 37 wherein said nitrogen source includes nitrogen ranging from 70 psig to 100 psig.

39. The system of claim 1 wherein said fluid source is an inert fluid source.

40. The system of claim 1 further comprising a flow regulator and a flow controller, wherein said fluid source is connected to said flow regulator and said flow controller is connected to said flow regulator and said opening in said capped end.

41. The system of claim 40 further comprising a fluid supply line connecting said fluid source to said flow regulator, connecting said flow regulator to said flow controller, and connecting said flow controller to said opening in said capped end.

42. The system of claim 40 wherein said flow regulator supplies fluid to said flow controller at approximately 5 psig.

43. The system of claim 1 further comprising an oven connected to said pump.

44. The system of claim 43 further comprising o-rings disposed in said oven for outgassing.

45. The system of claim 43 further comprising an oven controller.

46. The system of claim 1 further comprising a pump controller.

47. The system of claim 1 wherein said exhaust fitting is disposed proximate to said capped ends.

48. The system of claim 1 wherein said at least one opening of said semiconductor device fabrication equipment component leads to said surface for contaminant reduction.

49. The system of claim 1 wherein said surface for contaminant reduction is an internal surface.

50. An apparatus for contaminant reduction of semiconductor device fabrication equipment components, comprising:

a manifold closed at one end and configured to accept a purge fluid at another end, a fluid passageway, a plurality of inlets, and a fluid exhaust fitting disposed downstream from said inlets, said inlets and said fluid exhaust fitting in fluid communication with said fluid passageway; and

a plurality of manifold valves, each manifold valve being connected to one of said plurality of inlets and to each of which a semiconductor device fabrication equipment component having a surface for contaminant reduction is removably connectable, wherein said manifold valves are operable to place said removably connectable components into and out of fluid communication with said plurality of inlets.

51. The apparatus of claim 50 further comprising a plurality of caps, each of said caps removably connectable to said second end of said manifold valves and to at least one of said components.



52. The apparatus of claim 51 wherein one of said caps is connected to one end of one of said components when another end of said one of said components is connected to one of said manifold valves.

53. ~~The apparatus~~ of claim 51 wherein one of said caps is connected to said second end of one of said manifold valves in the absence of one of said components connected to said one of said manifold valves.

54. The apparatus of claim 51 wherein one of said caps forms a flange connection with one of said components when connected to said one of said components, and a flange connection with one of said manifold valves when connected to said second end of said one of said manifold valves.

55. The apparatus of claim 51 wherein each of said plurality of caps is connected to a cap valve.

56. The apparatus of claim 55 wherein each of said plurality of caps is connected to said cap valve via tubing.

57. The apparatus of claim 50 wherein at least one of said inlets is a downwardly facing inlet.

58. The apparatus of claim 57 wherein one of said components is a rotation assembly.

59. The apparatus of claim 58 wherein said rotation assembly is connected to one of said manifold valves with a ball joint.

60. The apparatus of claim 50 wherein at least one of said inlets is a frontwardly facing inlet.

61. The apparatus of claim 60 wherein said one of said components is a chamber ball valve.

62. The apparatus of claim 61 wherein said chamber ball valve is connected to one of said manifold valves with a flange connection.

63. The apparatus of claim 60 wherein said components include a pressure control valve.

64. The apparatus of claim 63 wherein said pressure control valve is connected to one of said manifold valves with a flange connection.

65. The apparatus of claim 50 wherein each of said semiconductor device fabrication equipment components includes an opening for connection to one of said manifold valves.

66. The apparatus of claim 65 wherein each of said semiconductor device fabrication equipment component openings leads to an inner surface for contaminant reduction, said inner surface placed into and out of fluid communication with one of said plurality of inlets.

67. A system for contaminant reduction of semiconductor device fabrication equipment components, comprising:

- a manifold having a main passageway with first and second capped ends, said first capped end configured to accept a purge fluid, a plurality of inlets disposed in between said capped ends in fluid communication with said main passageway, and an exhaust fitting disposed downstream from said plurality of inlets and being in fluid communication with said main passageway;

- a rotation assembly having a contaminated<sup>4</sup> surface;

- an equipment valve having a contaminated surface and first and second openings;

- a plurality of manifold valves, one of said manifold valves having a first end connected to one of said inlets and a second end connected to said rotation assembly, and another of said manifold valves having a first end connected to another of said inlets and a second end connected to said equipment valve at said first opening;

- a cap connected to said equipment valve at said second opening;

- a purge fluid source; and

- a pump configured to be coupled to said exhaust fitting.

68. The system of claim 67 further comprising a ball joint connecting said rotation assembly to one of said manifold valves and a flange connection connecting said equipment valve to another of said manifold valves.

69. The system of claim 67 wherein said equipment valve is a chamber ball valve.

70. The system of claim 67 wherein said equipment valve is a pressure control valve.

71. The system of claim 67 wherein said system is under vacuum.

72. The system of claim 67 wherein at least one of said plurality of inlets is downwardly facing and at least one of said plurality of inlets is frontwardly facing.

73. The system of claim 72 wherein said first end of said one of said manifold valves is connected to one of said downwardly facing inlets and said first end of said another manifold valve is connected to one of said frontwardly facing inlets.

74. A system for contaminant reduction of semiconductor device fabrication equipment components, comprising:

- a manifold having a main passageway with first and second capped ends, said first capped end configured to accept a purge fluid, a plurality of inlets disposed in between said capped ends in fluid communication with said main passageway, and an exhaust fitting disposed downstream from said plurality of inlets and being in fluid communication with said main passageway;

- a plurality of means operable to place said plurality of inlets into and out of fluid communication with semiconductor device fabrication equipment components removably connectable to said manifold,

- a fluid means for providing a purge fluid to said first capped end; and

- a pressure reduction means for providing a reduced pressure within said manifold, said pressure reduction means configured to be coupled to said exhaust fitting.

75. A method for reducing contaminants of semiconductor device fabrication equipment components, each component having a contaminated surface, with a manifold having a main passageway with first and second capped ends, said first capped end configured to accept a purge fluid source, a plurality of inlets disposed in between said capped ends in fluid communication with said main passageway, and an exhaust fitting configured to accept a pump, said exhaust fitting disposed downstream from said plurality of inlets and in fluid communication with said main passageway, comprising:

- providing said manifold;

- connecting a purge fluid source to said first capped end;

connecting a pump to said exhaust fitting;  
connecting at least one semiconductor device  
fabrication equipment component to at least one of said  
plurality of inlets;  
releasing a purge fluid into said manifold;  
placing said at least one component in fluid  
communication with said at least one of said plurality of  
inlets;  
contacting said contaminated surface of said at  
least one component with said purge fluid surface; and  
pumping fluid from said manifold.

76. The method of claim 75 further comprising placing  
said at least one component out of fluid communication  
with said manifold.

77. The method of claim 75 further comprising removing  
said at least one component from said manifold.

78. The method of claim 75 wherein the step of  
connecting at least one component to at least one of said  
plurality of inlets occurs at an opening of said at least  
one component.

79. The method of claim 75 wherein said surface for  
cleaning is an internal surface.

80. The method of claim 75 wherein contacting said  
contaminated surface with said purge fluid occurs under  
vacuum.